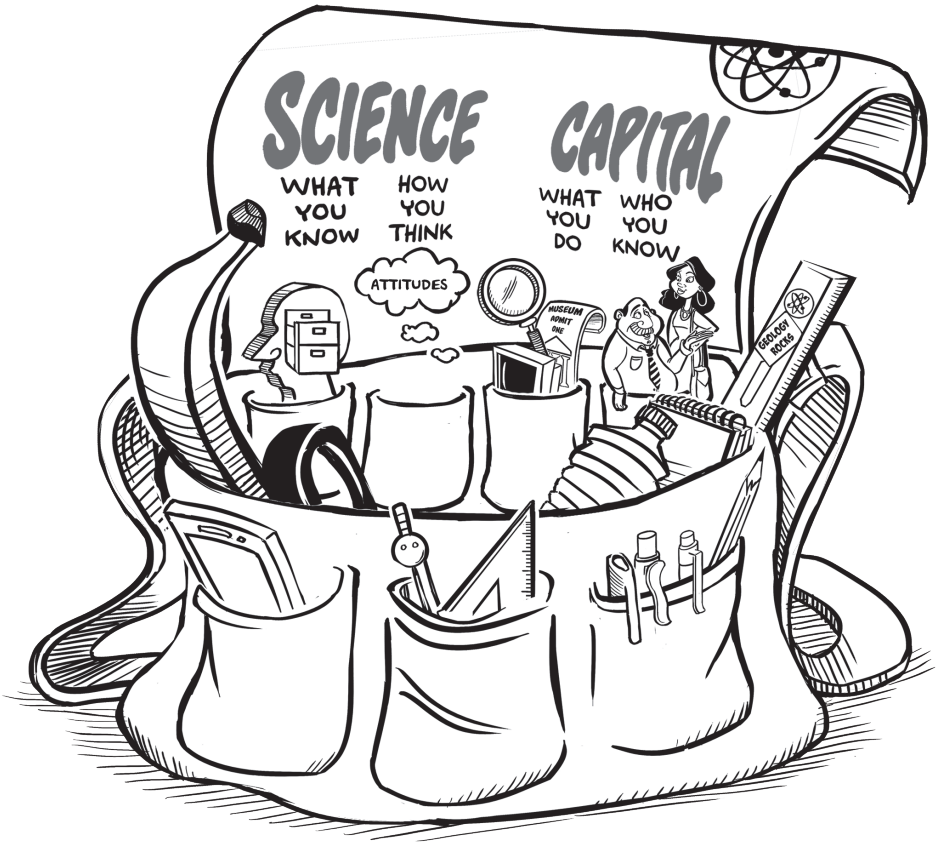
I'm a Scientist Get me out of here

# I'm a Scientist:
# Supporting Science Capital

September 2019



# Contents

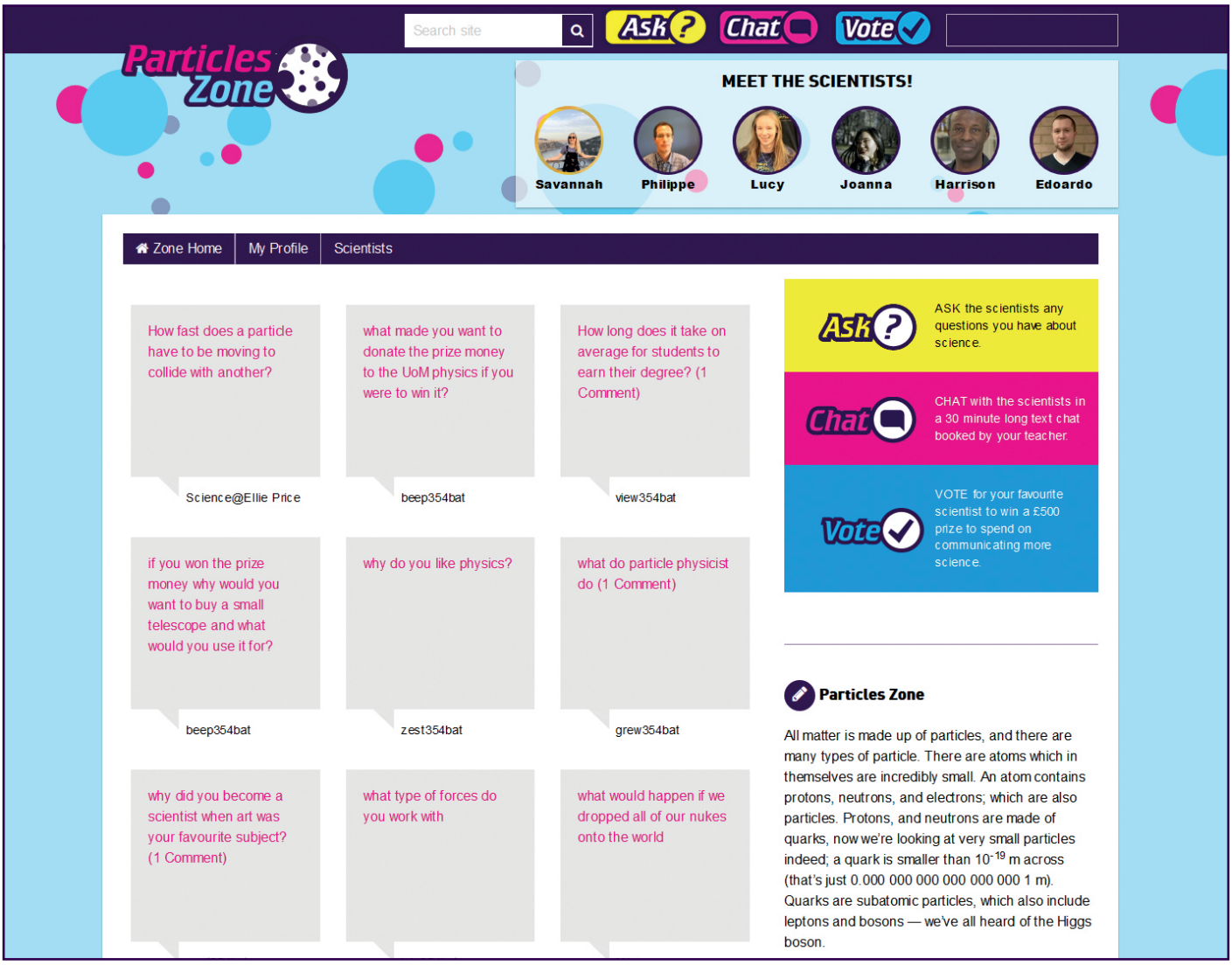
# Introduction

*I'm a Scientist, Get me out of here* (IAS) is a student-led, online science enrichment activity where students interact with scientists. One of its main aims is to encourage students to engage and identify with science, supporting the development of aspirations in science and coming to see it as 'for me'. In attempting to achieve these aims, IAS has been strongly informed by research around science capital.

**Science capital** is a set of resources that helps individuals engage and identify with science. It consists of four main categories: science-related knowledge (*'what you know'*), attitudes and values (*'how you think'*), experiences and activities (*"what you do"*) and contacts or connections (*'who you know'*). Young people with higher levels of science capital are more likely to see science as 'for me' and to choose to study science subjects at a higher level.

This report summarises research conducted by Jen DeWitt, PhD, examining the way that IAS may support students' science capital. The research consisted of student focus groups, teacher interviews, surveys and analysis of content generated on the IAS site including transcripts of live chats and questions asked by students.

The evidence produced by this research demonstrates that the experience of IAS maps onto elements of the Science Capital Teaching Approach (described below). In turn, this supports science capital-related outcomes of participating in IAS.



# *I'm a Scientist* and the Science Capital Teaching Approach (SCTA)

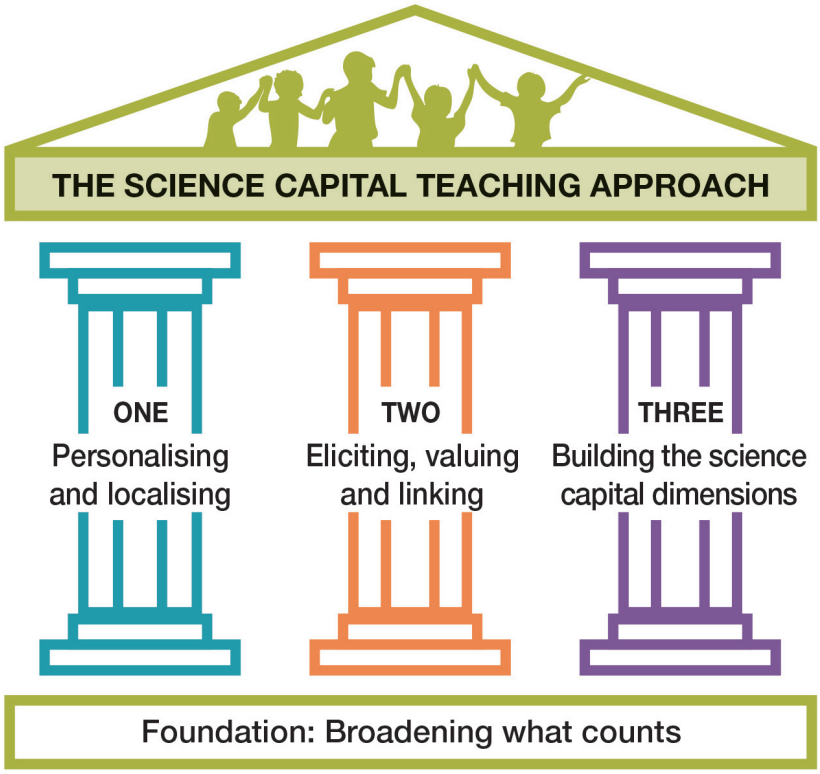
Following initial research on science capital, the science capital team, led by Professor Louise Archer, worked with 43 secondary school science teachers over a period of four years to develop the **Science Capital Teaching Approach** (Godec, King, & Archer, 2017). This approach aims to enhance young people's engagement with science, supporting them in seeing science as relevant to their lives and 'for me'. The foundation of this approach involves broadening what counts in the science classroom: creating a learning environment where all students feel able to offer contributions from their own experiences and interests. The approach also consists of three main pillars:

**1. Personalising and localising:** Going beyond contextualising, to connect to the actual experiences, understandings, attitudes and interests of young people.

**2. Eliciting-valuing-linking:** Inviting students to share knowledge, attitudes and experiences; recognising these has having value; and connecting this back to the science.

**3. Building the dimensions of science capital:** Considering the eight dimensions when developing activities, lessons or programmes.

This approach maps quite well onto the experience of IAS and considering IAS through the lens of the SCTA helps illustrate the way in which the experience can support students' science capital.

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# Supporting Science Capital

**The research described in this report found evidence that *I'm a Scientist* supports four of the science capital 'dimensions':**

- **Dimension 1:** Science literacy;
- **Dimension 2:** Seeing science as relevant to everyday life;
- **Dimension 3:** Knowledge about the transferability of science/science qualifications; and especially
- **Dimension 7:** Knowing people in science-related jobs.

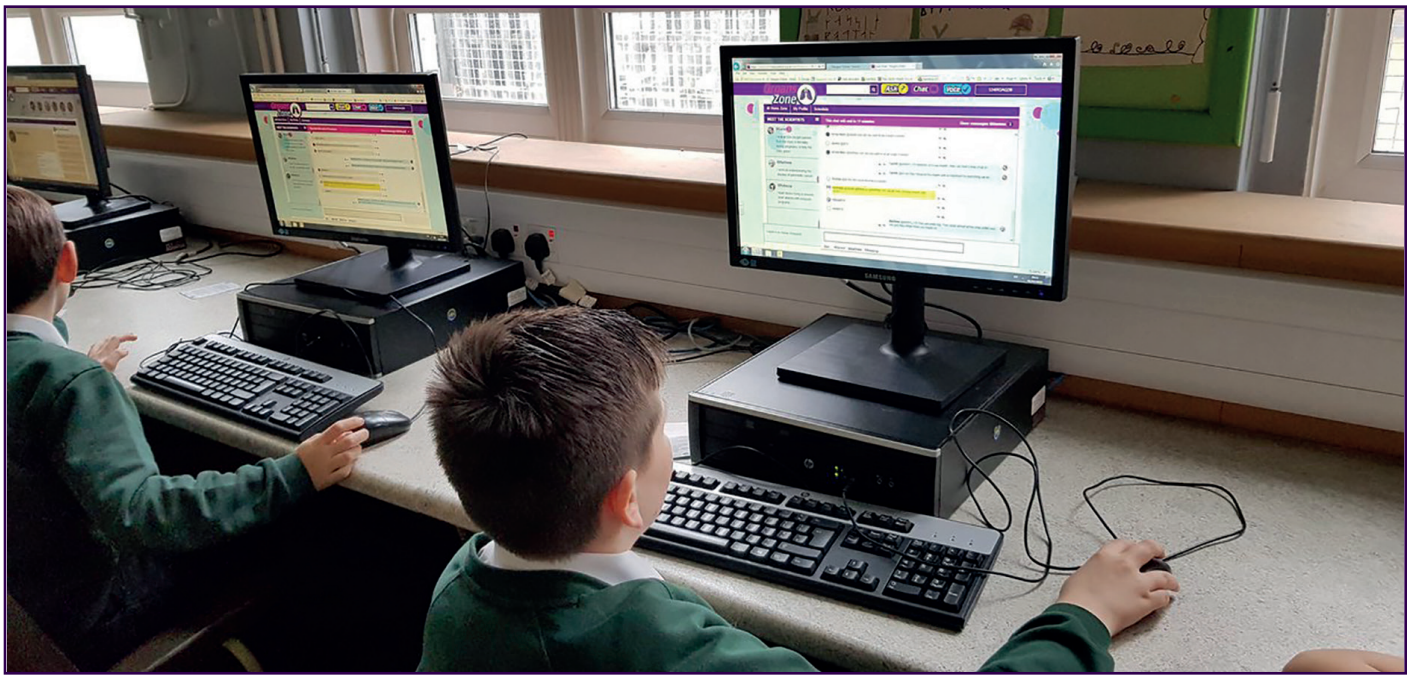
Although we acknowledge that 'meeting' scientists in IAS is not the same as having personal relationships with them, we believe that the experience of IAS provides support for similar outcomes to knowing people in science-related jobs — understanding what it's like to work in those jobs and, even more importantly, coming to see scientists as 'normal' people.

Research shows that this understanding — which is abundant in young people who have friends or family working in science — facilitates a sense that science is 'for me' and makes it more likely that an individual can envisage being a scientist as a 'possible self'. Consequently, developing or maintaining aspirations in science is more likely.

IAS is a relatively brief enrichment experience and cannot be exclusively responsible for developing students' science aspirations and maintaining a sense that science is 'for me' over time. However it has a valuable role to play in contributing to this process, especially for young people who may simply not have other opportunities to encounter people in science-related roles, much less to ask them questions of personal interest and relevance. And, indeed, our data suggest that IAS does have the potential to support or nurture science-related aspirations in participating students.

In this report, we explore in detail how IAS may support students' science capital. In so doing, we utilise the Science Capital Teaching Approach (Godec, King, & Archer, 2017) as a lens through which to consider the various elements of IAS. Research from the Enterprising Science project highlighted that in classrooms where the SCTA was implemented, students' science capital was supported and increased. While it is unrealistic to expect similar degrees of impact as was found after a year's worth of science lessons, applying an SCTA lens to IAS has helped us understand the outcomes we observed, as well as what elements of IAS may be contributing most strongly to them.

Considered in this way, IAS seems distinctively suited to support the development of science capital. Its whole premise — from who is encouraged to participate (e.g. widening participation and underserved schools) to the



Students at St. Bridget's Primary School take part in an IAS live chat

nature of the activity itself — is that of creating a learning environment where young people have the opportunity to contribute by drawing on their own experiences and interests (*'broadening what counts'*). More specifically, in live CHATs and in ASK, young people are invited to contribute questions (*'elicit'*). Scientists value these questions by responding — often in considerable detail. And the focus of each zone on areas of science often links these questions back to science content. Because students are in control and ask questions of interest to them (they are the ones deciding what to ask), the events are necessarily *personalised and localised*.

IAS also supports the development of dimensions of science capital. By providing the opportunity to ask about science content, it contributes to ***science literacy (Dimension 1)***. Because students can ask questions of interest to them personally, it can enhance science-related attitudes and values, helping students to see ***science as relevant to their everyday lives (Dimension 2)***. When students ask about qualifications, participation may improve their knowledge of the ***transferability of science (Dimension 3).*** Most importantly, however, IAS provides an opportunity to get to ***know scientists (Dimension 7)*** — about the paths they took to their current work, about a range of aspects of their work (e.g. travel, teamwork) and about their lives outside of work. Students may even discover that scientists are not all 'super geniuses' — that they are normal individuals, albeit with interesting jobs. While we would not claim that this is the same as knowing someone in a science-related job personally, the outcome is similar: coming to see scientists as people 'like me', whose careers may be attainable, rather than distant and impossible.

In sum, IAS is personally relevant to students and their lives, elicits and values students' questions and experiences, and provides support for building dimensions of science capital. Together, its various elements create an environment in which students are able to contribute from their own interests and experiences. Consequently, through participating in IAS, students can come to see science as personally relevant to them and to appreciate that scientists are 'normal people'. Moreover, ultimately it is the participating students who are in control — it is their votes that determine the winner. This environment, we believe, reinforces that the 'field' of *I'm a Scientist* is one in which it is students' valued and valuable opinions that count the most.

Together, then, the elements of IAS can support students' science capital, meaning IAS has an important role in helping young people see that science just might be 'for me' which, in turn, can contribute to nurturing science aspirations.

# Personalising and localising
## SCTA Pillar 1

**In this section and the ones that follow, we examine *I'm a Scientist* through the lens of the three pillars of the Science Capital Teaching Approach (*Personalising and localising, Eliciting-valuing-linking, Building the science capital dimensions*) and consider how features of IAS map on to these pillars.**

The first pillar of the SCTA, *Personalising and localising,* involves making science personally relevant to the everyday lives of students. It goes beyond contextualising to relate directly to students' own lives and interests.

The characteristics of IAS that support it being a personalised experience for students — one that links to their daily lives, experiences and interests — include its online, pseudonymous, informal nature, which encourages students to ask personally relevant questions to the scientists. These direct interactions with scientists, in turn, create a sense of authenticity and trust, further enhancing the personal nature of the experience.

Being online provides students with a cloak of **anonymity** that gives them confidence to ask the questions that are personally relevant to them:

> *I'd just be more confident, I think, I just feel easier asking.*
> ***Student***

Students told us that **being online** was different to a face to face meeting: not being in the spotlight; being given time to think about and type their question. There was less fear of messing up:

> *I would get extremely nervous and I would start mumbling, and I wouldn't make any sense — I would only have a limited amount of time. I would start rushing, they wouldn't be able to understand me, so I wouldn't get a question answered as well as it could have been.*
> ***Student***

It also gave them the confidence to ask what was important to them without being constrained by what classmates might think:

> *If you had a more personal question about, their life or something, you might think, oh, other people aren't interested, but if it's online, like, it's easier to do, so…*
> ***Student***

Or by the context of a visit, which can narrow the scope of what students feel they can ask:

> *Yeah, I think it was different because they actually got to ask them, not personal per se, but what they like, what they dislike, what schools they went to, whereas when they go to the other places, they interact in terms of what the place is offering.*
> ***Teacher***

Students getting their questions answered directly by real scientists, is absolutely central to the impact of IAS. Knowing who is answering the question (and that it's someone they know something about) contributes to a sense of **authenticity and trust**:

> *It's like when they did answer questions like, you know that it is true … you know if you like Google it on Wikipedia or something, like that could not be true, but … cos they're like in that field of work and research .. you know that their answer is right.*
> ***Student***

> *Yeah, it was more interesting, 'cause we were getting first hand information from the scientists themselves, instead of reading in textbooks and taking notes from the teacher.*
> ***Student***

Teachers explained how having that direct and immediate interaction with an authentic and trusted adult is not a typical experience for school students.

> *I think it's simple as their specific questions get answered. It's that one to one interaction, that personal interaction, they just don't get that and then there's a to and fro and then they can continue with the conversation and then other people can kind of chip in and it becomes, it's something that you do, I guess, in research when you're older, but in their age, they don't have a chance to interact.*
> ***Teacher***

> *They got the chance to speak to somebody who's actually working in that field, so rather than me always spouting what I know, which sometimes isn't enough to go as in depth as somebody who works in that field and it's giving them those chances to see what else they can do.*
> ***Teacher***

Teachers also commented on student enjoyment of the immediacy and the personal nature of the live CHATs:

> *Yeah, a lot of them were saying, oh, that's a great question, such and such about it and was like, they were going, I've got a response, I've got a response and you could see that they had all the personal responses come up in a different bit of the chat, so it was quite nice.*
> ***Teacher***

In addition, while the immediacy of the live CHATs contributed to a sense of connection and of getting to know the scientists personally, the extended length of the activity and being able to ask further questions in ASK further supported this connection:

> *Instead of asking them in person you might only have limited time to talk, but online like you said it's over about two weeks — so if you think of one, later that day you can always put it on there, it doesn't necessarily have to have it there and then.*
> ***Student***

# Eliciting, valuing and linking
# SCTA Pillar 2

**This second pillar of the SCTA involves eliciting students' knowledge (or in the case of IAS, questions) that draws on personal, family and/or cultural experiences, valuing their contributions, and linking these back to the science.**

## ASK and CHAT

ASK and, especially, the live CHATs, map on well to this second pillar of the SCTA. The very nature of the experience elicits students' interests and experiences, which they can express via their questions. By replying to the questions, scientists value what students have offered (or asked), reflecting that these are the kinds of questions that do belong in a science lesson/science context – broadening 'what counts' in this setting.

In the following exchange, scientist Andy values the personal questions and comments of students:

***Student 1:*** *Hey andy what will your comic be about?*

***Andy (scientist):*** *still trying to work it out. I want to use it to show the real experience of inequality and homelessness - any ideas on how to make it happen?*

***St1:*** *@Andy I think your comic should be about your life*

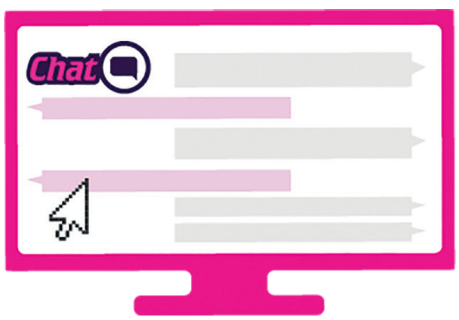
***Andy:*** *interesting, why do you say that?*

***St1:*** *@Andy as in the life of a man who helps the homeless*

***Andy:*** *that's an interesting idea - I suppose it could tell the story of how research helps? im too close to judge whether that would be interesting?!*

***Student 2:*** *@Andy what is your comic going to be about ?*

***Andy:*** *had some ideas - but open to more ideas as well*





This valuing was also commented on by the students and teachers:

> *The interest showed in their responses from our questions, they seemed really eager to answer our questions and to, like, show us what they do.*
> ***Student***

> *And I think one of the scientists put, oh, that's a great question, about three times, 'cause we had it up on the board, so everybody could see it as well and they were all going, oh, [child's name], he said you again, so there was all this of the good questions that he was asking and it's thinking, well, I just wish he'd ask it in class, but never mind...*
> ***Teacher***

The above quote from a teacher also reflects the power this kind of valuing can have, especially for a shy student.

# VOTE

In IAS not only do students decide which questions to ask the scientists, but they also determine which scientists to vote for and, thus, who wins the competition. This environment in which the students' opinions count so much highlights that a science context is one in which what they bring is **valued** — and the valuing of their opinions is heightened further by the £500 prize for the winner. The importance of voting to the overall experience is reflected in student and teacher comments:

> *I think voting is good, 'cause it kind of makes you want to know more, 'cause you want to make sure that your vote is, well, I know I want to make sure my vote is, like, good, so…*
> ***Student***

> *They'd ask me in the corridors and on the playgrounds who had been voted off… There was one pupil that I didn't think was actually engaging,and she was actually the one that came and asked me every day who's been voted off — which surprised me actually.*
> ***Teacher***

> *It definitely adds something to it rather than just being a chat with scientists — it helps them think okay what do we want from a scientist, what would make us excited about a scientist.*
> ***Teacher***

> *I very much sold it on that aspect of the power is in your hands, you decide. So I think that is a real big part of the whole experience.*
> ***Teacher***


Students at St. Bridget's Primary School take part in an IAS live chat

# Building the science capital dimensions
# SCTA Pillar 3

**The third pillar of the SCTA involves considering the eight dimensions of science capital when planning activities or lessons. Our research found evidence for *I'm a Scientist* supporting four of these dimensions: Science literacy *(1), Seeing science as relevant to everyday life (2), Knowledge about the transferability of science (3), and especially Knowing people in science-related jobs (7).***

## Knowing scientists
## Dimension 7

The heart of IAS is connecting students with scientists. The programme allows students to get to know a **range of participating scientists** and come to **develop a rapport** with them. Our research found that through IAS, students come to see scientists as 'normal' people, developing understanding of their lives outside of work and having 'clever scientist' stereotypes challenged.

They also develop a better understanding of work in science: of the diversity of jobs, the routes into them, and the nature of the work.

### Scientists as people

A key science capital-related outcome, which often comes from knowing people in science-related jobs, is that of seeing scientists as 'normal' people, who might be 'like me' and who work in jobs that may be possible 'for me' as well.  That is, IAS helps 'normalise' scientists and jobs in science for participating young people.

One feature of IAS that helps normalise scientists are the live CHATs, in which a **conversational rapport** between scientists and students can often be seen developing. The **range of scientists** who participate also increases the odds that students will encounter one with whom they can form a personal connection.

### Developing rapport

An exploration of the CHAT transcripts often reveals a rapport developing between a scientist and an individual student. That is, not only are the CHATs very informal and conversational in nature, but also this seems to encourage a rapport that very likely contributes to students feeling that they are getting to know the scientists and to their forming a connection with them. The exchanges below are examples of this kind of rapport:

***Student:*** *@Trystan is this the job you want to do for the rest of your life, or would you do something else?*

***Trystan (scientist):*** *I want to do research for the rest of my life, but I might not stay working at universities. I might work for the government, for public health england, or somewhere like the world health organisation, and do research for them*

***St:*** *@Trystan thank you for answering my question, it was a very interesting answer :)*

***Trystan:*** *I'm glad you think so! Thanks for your question*

***St:*** *@Trystan if you weren't a scientist, would you do something to help the homeless? i think it is a very important issue*

***Trystan:*** *I agree its very important! I sometimes volunteer at a local night shelter. The research @Andy does is really important in understanding homelessness and its effects*

***St:*** *@Trystan thank you for answering my question!*

***Student:*** *have you ever heard of panic! at the disco??*

***Danny (scientist):*** *I used to listen to them growing up!*

***Student:*** *yaay danny, you know panic!*

The **conversational tone** or feeling of the CHATs was also noticed by the students:

> *But they came back with, like, paragraphs of answers… And they asked you questions back as well.*
> ***Student***

And this primary school teacher summed up the way in which the chat was like a personal conversation:

*That chance to chat to somebody, so they got to ask their own questions, they got to design their own questions, there was no, this is the question we're asking and there was no waiting, for them it was almost like an instant…Like a conversation.*
***Teacher***

The way in which their questions were answered (e.g. the level of detail) also influenced the extent to which students felt their questions were valued and also to which they formed a connection with scientists:

*He's just very enthusiastic, every answer you have is, like, he gives his own opinion on it, which really makes his answers strong and it really makes a statement, yeah….He gave really explained answers.*
***Student***

*I liked Rashid because, like, he wouldn't just sit there and answer all the questions, he would take time and recap it and then answer the question.*
***Student***

Having shared interests/hobbies which often came through in the CHATs also sometimes contributed to a sense of connection:

*Well I again thought Danny, because like he was very similar, he had many similarities, and I think he answered most of my questions…. just what are your favourite films, favourite like programmes, we both had like the same things, so I found like it was easier to connect with him.*
***Student***

Having a research focus on something of personal concern to students and/or related to their aspirations also supported these connections which, in turn, enabled rapport to develop and conversations to flow:

*Andy I think because he was like doing research and things to do with homelessness as well, like to try and teach people about it. I feel quite strongly about that as well, so I thought that was quite good.*
***Student***

*Like with Danny how it's like looking into like microorganisms and like stuff about the body and stuff like that – I feel like that really related to what I want to do when I'm older.*
***Student***

*'Cause he (Matthew) studied cancer and my Nan died of cancer.*
***Student***

## Range of scientists

The opportunity to **interact with multiple scientists** during an event (via CHAT and ASK) — rather than just one or even two, as might happen during a typical 'talk' or visit — increases the chances of students getting their questions answered, which is the starting point for getting to know scientists.

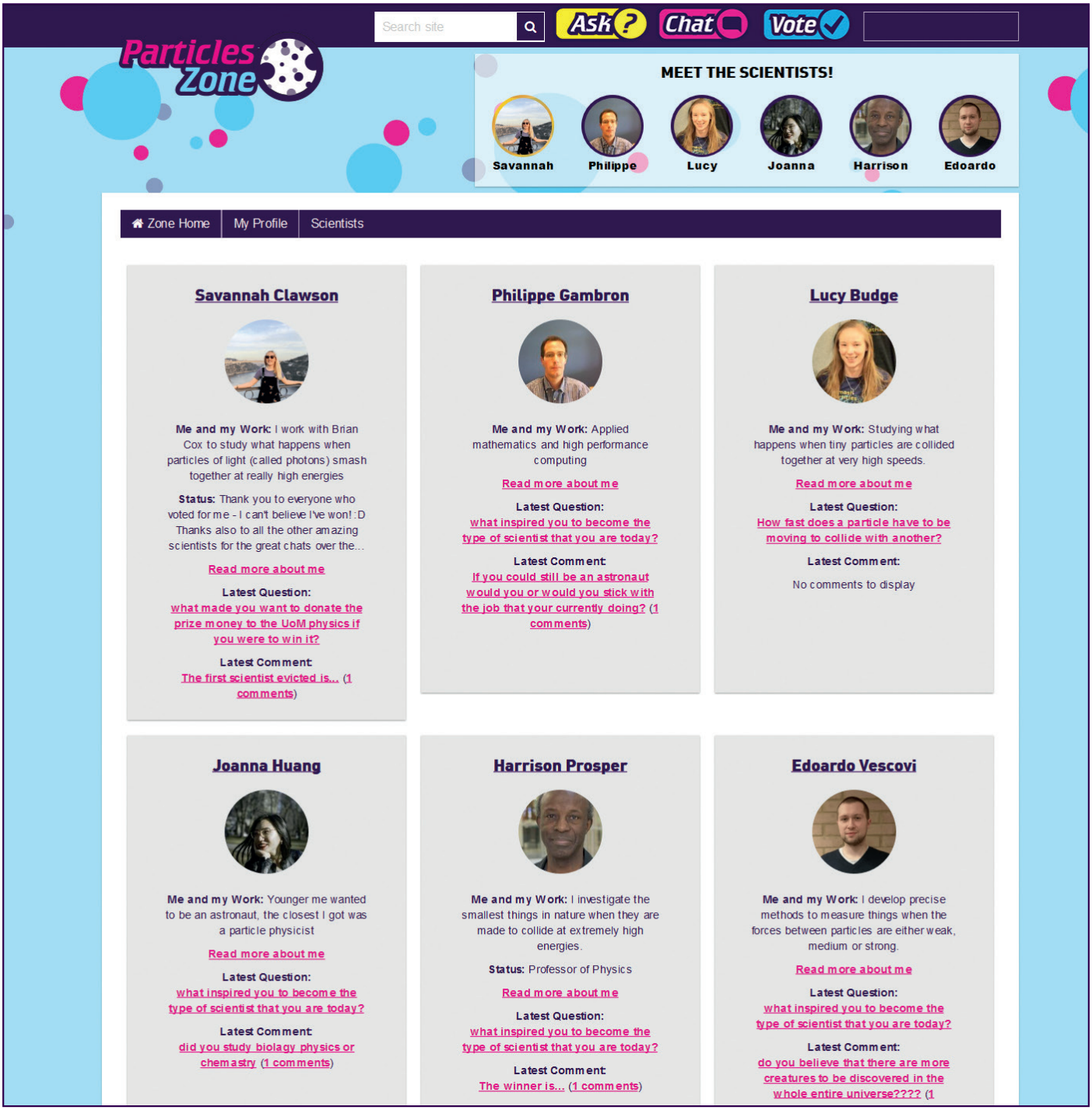
*Because there were so many different categories of science you could ask any question, and at least one of them would have the answer.*
***Student***

More prosaically, being able to communicate with more than one scientist also means that questions were more likely to be answered, particularly in comparison with the experience of a single scientist visiting a school assembly, or even a classroom:

*If you're in a room with other people, you put your hand up, you're not always going to get your question answered.*
***Student***

When students have such an opportunity for many interactions there is an increased possibility that they will be able to experience a more personal connection with at least one scientist. In addition, when students meet multiple 'normal' scientists, it highlights that a normal, non-stereotypical scientist is not, in fact, an exception and that many scientists may be similarly 'normal'.

Such an impression is further reinforced by the scientist **profiles**, which reflect the scientists' lives, not just their work, and are designed to let their personalities come through.




*I really like that they had, like, their favourite joke, I thought that was really good, just 'cause it makes them a bit more human, even though obviously they're over a computer, I like that they had their profile, what are their favourite foods and what their favourite joke was, I thought that was a really good touch.*

***Student***

## Lives outside of work

Through these conversational, personal interactions with a range of scientists, IAS broadened students' perceptions of scientists as people – helping them come to see people who work in science as 'normal', with families, interests and hobbies, impressions further reinforced by scientists' profiles on the site.

*I thought that … they stuck to their sciences, but when I was reading through all of their different profiles I realised that some of them do do outdoor things and things that they wouldn't do in the science lab. And the fact they're not robots, that they do have human emotions.*

***Student***

*We were talking to him about snowboarding and stuff, yeah, it's just like they're normal people that are doing research, I guess.*
***Student***

*As you're a kid, you have this image of a scientist wearing a white lab coat, some glasses, always having a book, but then when I talked to them, it changed, it's like they're just normal people with normal lives, but they're just a teeny bit smarter than everybody else.*
***Student***

*Seeing the competition you sort of realise that scientists aren't just scientists, they do have their own life.*
***Student***

*I think it made me realise that, when you read their profiles, they're all, like, just normal people.*
***Student***

These interests also emerge in the CHATs, where they often act as a point of connection between students and scientists:

***Student:*** *whats your favourite video game*

***Verity (scientist):*** *left for dead 2, because I'm low key obsessed with zombies*

***Student:*** *@Verity what did you want to be when you were growing up?*

***Verity (scientist):*** *an author! I loved fantasy novels, and thought I could write them too. I did start writing one, but it was a bit rubbish honestly*

***Student:*** *@Danny What is your favourite continental food?*

***Danny (scientist):*** *Does pizza count? I'd definitly say pizza if so!*

Some of the teachers also felt that this outcome of seeing scientists as 'normal people' had been attained from their students' participation:

*I think it just puts a face, it gives an experience and something they can relate to when they look at the faceless psychologists that they come across, I think it just makes it more real…Gives it a grounding, I guess, that they don't have normally.*
***Teacher***

The direct connection with scientists also helped dispel the notion of scientists as abstract names attached to studies in text books.

*I think it was the whole chatting thing, 'cause when you think about psychologists, you see them in the perspective of, it's just a name in a textbook or it's just a name in, like, on top of a bit of research and I think chatting to them made them, like, real people, rather than just a bit of text.*
***Student***

The acceptance of personal, non-scientific questions also clearly contributes to students forming impressions of scientists as normal people.

*I also liked it because it wasn't just from a computer, there was personalities, some of the answers.… Like, if you asked a personal question, they'll answer it on a personal level.*
***Student***

Finally, the overall informal nature of IAS encourages the scientists to let their personalities come through, which as noted, supports students' appreciation of them as normal, regular people.

*Every scientist had a formal talk, but some of them decided to add a bit of humour in too… [Peer]: Oh, yeah, make us laugh and stuff.*
***Student***

*Like 'Do you have children?' and some of them asked how easy it is to maintain a job and work and have children. So some of the girls were definitely asking about that, kind of can you have it all. And they were really honest, that was really good, the psychologists were really honest about that.*
***Teacher***

*I think it made me realise that they, I don't know, like, when you read their profiles, they're all, like, just normal people.*
***Student***

## Challenging 'clever scientist' stereotypes

One specific way in which IAS helps make scientists appear more 'normal', (and which aligns with the aims of the Scientist Capital Teaching Approach) is by challenging stereotypes of scientists as extremely clever.

> *I originally thought they'd all be like quite famous and they'd spend lots of time doing it, but not like normal everyday people could be scientists.*
> ***Student***

> *you don't have to know everything about science to be a scientist.*
> ***Student, survey***

However, scientists were generally perceived to be very hard-working and determined, and many students continued to grapple with the notion of scientists as clever, or to maintain this perception to some extent:

> *Well I think you kind of have to be at least a little bit clever in the first place and then once you go to all your essons and do all your degrees and everything you will be able to do it.*
> ***Student***

Even more nuanced, some students felt that although there might be a need to be intelligent, this was something that came from learning or working hard, not necessarily something inborn:

> *You don't have to be intelligent, you have to try hard. And if you try hard then you can achieve anything you want. You don't need to just be intelligent — you can become intelligent by working hard, working hard in lessons and pursuing your dreams.*
> ***Student***

One particularly effective challenge to the 'clever scientist' stereotype occurred when scientists and students talked about failure, struggles or not doing particularly well in school:

> ***Student:*** *@Andy have you always liked science*
>
> ***Andy (scientist):*** *I guess. I didn't love it at school, but generally found it OK. But then it gave me the basis to go and explore more things I was interested in later.*

> ***Student:*** *Did you apply for a different job before science?*
>
> ***Verity (scientist):*** *yup! I applied for a graduate scheme when I finished that would have been in organising money for science, but I didn't even get an interview haha*

> ***Student:*** *@all have any of your experiments/theories gone wrong?*
>
> ***(Scientist):*** *yes, most of them!*

> ***Student:*** *Were you norty in school?*
>
> ***Maia (scientist):*** *I was often naughty in school, I spent a lot of time in detention for being late and not paying attention in class [need to ck which chat]*

> ***Student:*** *Did you always want to be a scientist?*
>
> ***Agnes (scientist:*** *I didn't know what I wanted to be for most of my life!*

Overall, participating in IAS seemed to help students perceive scientists as 'normal people doing normal jobs', a perception often shared by individuals with higher levels of science capital:

> *Because when I was younger I used to think that scientists would be really tired, so like if I went out onto the street and I looked around, I'd think that I'd be able to find a scientist that was just walking around like really easily. But based from our experience from I'm a Scientist I know that you wouldn't really be able to tell the difference between someone that's not a scientist and someone that is.*
> ***Student***

> *I think it really helped them look at scientists as real people, not just those far out people who, maybe in your head, your picture of a scientist has been this mad, crazy person, who just looks at books and stuff, there was practical activities and as well there was some women on as well, so it was good for that, to see these women in science and to raise those aspirations of the girls that we have.*
> ***Teacher***

## Work in science

Knowing people in science-related jobs (Dimension 7) also makes it likely that individuals have a awareness of the jobs themselves — which, in turn, can contribute to a sense that such work might be 'for me'. Our data also highlighted that through IAS, young people developed a better understanding of what it's like to work in science. For instance, on the post-survey, 81.3% of respondents agreed that after taking part in IAS, *'I know more about scientists' jobs'*. Focus group data, as well as the teacher interviews, also strongly reinforces the notion that students gained a deeper understanding of careers in science.

### Diversity of jobs in science

Data from the focus groups, teacher interviews and surveys suggests that students gained an appreciation of the diversity or range of jobs in and from science:

> *I've learned that there are so many different paths you can take using sciences (particularly psychology).*
> ***Student***

> *That not every scientist works in a lab and there is a huge variety of different jobs.*
> ***Student***

One of the teachers also commented on how IAS had opened her sixth formers' eyes about the breadth of jobs involved in psychology:

> *It just helps open their eyes to psychology, it's not just an A' Level syllabus, it's not a degree, it's so much stuff, it's psychology [...] I think it's just that realisation that psychology is a massive thing, you don't have to be a, what is a psychologist, it's not one job…*
> ***Teacher***

Similar comments also came from another teacher (again about psychology):

> *Having exposed them to these experts with this wide ranging areas of expertise was great. And for some of them they're thinking 'Oh I didn't realise this' — they're actually pursuing and looking into careers in these areas now, so I think it's got them 1) excited, 2) opened their eyes to other possibilities, and … they're taking it a bit more seriously as well actually.*
> ***Teacher***

And from a teacher who had done IAS with her STEM club:

> *I think it opens their eyes to other possible careers in the STEM field, because normally they talk to you about doctors, pharmacists, engineers, but that's as much as it goes, they won't [mention] physicist or an astrophysicist or chemical engineer and things like that, or even accounting, yeah.*
> ***Teacher***

### Nature of work in science

Students also seemed to gain substantial insight into the nature of science-related jobs.

Travel opportunities were a common unexpected feature:

> *… when I picture a scientist, I picture them just like in a lab just working — where they have like lots of jobs that they do outside or in different countries and they go to different places. I think that just kind of surprised me.*
> ***Student***

> *Because we asked them if they had, like, travelled to different places and it was quite interesting to know, not that they had time outside of work but because of the job they did, they actually had time to go places.*
> ***Student***

> *A scientists job is not about staying in a lab and it is living in different countries*
> ***Student, survey***

IAS also challenged students' impression that a job in science was all-consuming without time for things like hobbies or a social life:

> *Originally I thought it took out most of your time and you wouldn't have much time to do anything else, but I realise that you have a lot of time to have hobbies still, your job isn't your entire life, it's just a part of it.*
> ***Student***

Additionally, it provided a clearer picture of how difficult the work of scientists might be:

> *I feel like science is like a very hard subject, but it doesn't seem as like apart from other jobs anymore, it just seems like quite a normal job to me.*
> ***Student***

*After speaking to the scientists it gave like the whole like science and everything that follows like a bit more of a sense of reality, because I've never spoken to a scientist before. So it kind of made it a bit more reachable as a goal, and like it makes you understand that no matter where you come from or how much knowledge you have you can still work for it.*
***Student***

As well as how interesting the jobs are:

*That's it's not just in the lab you can also work outside! It's not boring it's actually really fun and has a big impact on people lives!*
***Student, survey***

*I have learned that science isn't just sitting with some test tubes pouring them into a big pot and that they are real, rather interesting jobs that I could consider.*
***Student, survey***

Students clearly came to realise that work in science involves more than being in a laboratory, an insight with the potential to impact on aspirations — at least broadening the options that might be considered.

## Routes into science

It seems that participation in IAS also gave some insight into the range of pathways into science careers, and, in particular, highlighting that there is not one single pathway which must start very early:

*Sebastian was, like, during university, he was doing photography but then later in the middle of the year he changed to science.*
***Student***

Responses to open-ended questions on the surveys also highlighted similar increases in awareness around science-related careers and what they entail.

IAS also may have helped challenge the belief that to become a scientist, a person must know they want to do that — to have that passion and to pursue it unwaveringly from a very young age, making it something unattainable for young people who might not be certain about their career goals:

*I feel like before it seemed like such a job ... like something that I would never be able to reach. Where now it seems like they have tried and they didn't necessarily know that they wanted to do that until maybe they were a little bit older or done their GCSEs. I think it was easier to reach than I thought.*
***Student***

*I have learnt that many scientists did not have any clue as to what they wanted to be when they left school.*
***Student***

*I learnt that most of the scientists dream jobs were not science when they were younger.*
***Student***

*I learnt that u can be whatever u want to be and science doesn't have to be your favourite subject to be a scientist.*
***Student***

*They were asked things like when did you know you wanted to be scientist, and I don't think any of them said like 'Oh yeah I wanted to be it when I was 5' — it was kind of a bit more like our age or maybe a bit older when they were studying for their GCSEs ,and then obviously at A Level and moving on to university. And it wasn't always what they wanted to be, like some of them were saying that they wanted to be other things that weren't anything to do with science. So it's not something that is like written up for them since they were a young age and that's what they were going to be – it isn't always that, sometimes they decide 'Actually no, I want to be this instead of what I was going to be'.*
***Student***

*You can see some of them might have started somewhere and they sort of veered into a different direction.*
***Teacher***

Overall, participating in IAS did seem to have an impact on students' awareness of science careers and what they entail: a critical step in coming to consider such jobs as accessible and possibly 'for me'.

# Other science capital dimensions

**While IAS clearly and strongly supports Dimension 7 of science capital, our research also found evidence linked to Dimensions 1, 2 and 3.**

## Science Literacy – Dimension 1

Students reported learning science content. 90.3% of respondents to the post-survey agreed (or strongly agreed) that they had learnt something new about science from taking part. In addition, many of the responses to the open-ended question on the post-survey about what students had learnt referred to content, such as:

> *About global warming and how it effects sleep patterns.*
> ***Student***

> *I learnt that there are many black holes in the universe.*
> ***Student***

> *Sleep has many functions and it gains back energy during sleep. If you had certain head injuries sleep helps to recover that so sleep is very important!*
> ***Student***

## Seeing science as relevant to everyday life – Dimension 2

78.6% of respondents agreed that following IAS, *'I have a better understanding of how science relates to my life.'*

Some of the survey responses also suggested an increased sense of the relevance of science:

> *I have learnt that science is related to everything we live for.*
> ***Student***

Likewise, in the focus groups, there was some indication of the way in which IAS made science seem more relevant to their lives and interests, especially compared with science lessons:

> *Well I found it easier [to connect science to my own life] in I'm a Scientist because you could actually talk to people that know about what you want to know about.*
> ***Student***

> *Well you could ask questions that you thought were interesting, about particular … like what's good topics. So like I'm not a fan of physics, but cos it's 'Epidemic* [themed zone]' *I could ask questions about the plague or like stuff relating to other subjects… Which in class we wouldn't really look at.*
> ***Student***

## Transferability of science (skills, knowledge and qualifications) – Dimension 3

Our research found some evidence of increased awareness of the transferability of science. In line with this, some students seemed to feel that a science qualification might be more relevant to their interests or aspirations (even if those are not in science).

> *I feel like it's just quite interesting because usually you just learn science or sometimes do a practical, but with this you could learn how you could take that science to another level and have it as a job and carry it on further. And even reading about where they went after school, like to universities and things, when they wrote it all down … so it's quite interesting to see where the science could take you that we've been learning.*
> ***Student***

Some of the comments on the post-survey also suggested an increased awareness of the range of jobs that science facilitates:

> *The wide variety of Careers that science enables you to go into.*
> ***Student***

> *There are more oppurtunities in terms of job applications than meets the eyes for certain degrees.*
> ***Student***

Finally, there is evidence, discussed in the section below, that participating in IAS reinforced students' aspirations and gave them insight into which science qualifications might be useful for attaining them. That is, the focus of IAS on educational and career trajectories of scientists supports Dimension 3 of science capital by demonstrating the utility of science qualifications and, importantly, provides a level of specificity (i.e. by being explicit about which science qualifications could/should be pursued)

that can help students really see the applicability of science qualifications for particular aspirations.

In sum, the experience of IAS, culminating in the experience of voting and determining the winner, aligns well with the Science Capital Teaching Approach, and the pillars of *Personalising and localising*, and *Eliciting, valuing and linking*, as well as supporting the science capital dimensions. Additionally, it seems that all the elements together (CHAT, ASK, Voting and so forth) form an integrated whole, through which the SCTA is enacted and which contribute to building students' science capital.

# Impact on aspirations

Since its inception, *I'm a Scientist, Get me out of here* has tried to encourage and nurture students' aspirations in science. It is this aim which led to a focus on science capital. As the *ASPIRES* research has shown, students with higher levels of science capital are more likely to develop and maintain aspirations in science. Put differently, individuals with more science capital are more likely to see science as 'for me', and, in turn, to aspire to careers in science. Although science aspirations and science capital are not the same, they are closely related and thus it is encouraging that after participating in IAS, students seemed more willing to consider working in science. For instance, on the post-survey, 63.3% of students responded *'very likely'* or *'probably will'* in response to the question *'When you finish your education, how likely are you to look for a job that uses your science knowledge or skills?'* While there is not a comparable question on the pre-survey, this is substantially higher than the proportions expressing interest in science-related jobs in other research (e.g. ASPIRES).

Moreover, there is some evidence that participation in IAS supported or reinforced students' aspirations:

> *I think maybe it pushed the ones that wanted to a bit further and maybe excited others a little bit, sparked a fire or yeah I couldn't say 100% though, but we sort of converted some but it definitely helps, yeah.*
> ***Teacher***

> *And some of them were a bit more firmer about what they wanted to do kind of post 6th Form, so yeah it definitely got them thinking a bit more deeply about next steps.*
> ***Teacher***

> *It also informed me on what subjects to do to become a paediatrician.*
> ***Female student***

> **Female student:** *It gave an example of what you should have done and what you should revise on, obviously Science, but other things, like English, so you know your chronological order of ways, like Mathematics, because there's a lot in STEM and Science and other things like Engineering, even maybe DT.*
>
> **Int:** *Yeah, so it gave you a lot of information and what about the rest of you, do you feel like it kind of rein*forced what you're thinking you might want to do or not so much?
>
> **Female student:** *It made me want to do it more.*
>
> **Female student:** *I knew from then what I wanted to do, but it didn't exactly change my idea, 'cause before I was, like, I could do this but I could also do this, but now it's just, I want to do this, I want to go for this and if I don't, then…*

Although these students were already interested in science, it is worth recalling that part of the importance of science capital is that it helps sustain science-related aspirations over time. Consequently, by reinforcing students' science aspirations, IAS contributes to this process.

# Quote note

Throughout this report quotes from students taken from focus groups transcriptions have been edited to remove verbal tics, and additional phrasing to make them more readable.

For example:

> *I knew from then what I wanted to do, but it didn't exactly change my idea, 'cause before I was, like, I could do this but I could also do this, but now it's just, I want to do this, I want to go for this and if I don't, then…*

Was originally transcribed as:

> *I knew from then what I wanted to do, but ~~then speaking to them, it was like,~~ it didn't exactly change my idea, 'cause before I was, like, I could do this but I could also do this, but now it's just, I want to do this, I want to go for this and if I don't, then…*

And

> *I think it made me realise that, when you read their profiles, they're all, like, just normal people*

Was originally transcribed as:

> *I think it made me realise that ~~they, I don't know, like~~, when you read their profiles, they're all, like, just normal people*

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